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CATALOGUES FOR REMOTE SENSING DIGITAL DATA TAPES

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INTERDISCIPLINARY APPLICATION AND INTERPRETATION OF ERTS DATA
WITHIN THE SUSQUEHANNA RIVER BASIN

Resource Inventory, Land Use, and Pollution

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CATALOGUES FOR REMOTE SENSING
DIGITAL DATA TAPES

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All remote sensing digital data tapes available to ORSER are catalogued and entered into a library. The cataloguing and submission to the library takes place as soon as possible after the receipt of tapes. The library has two sections, active and inactive. The active library section resides in the Computation Center at The Pennsylvania State University and the tapes in that section are managed by the Computation Center in accordance with their policies and procedures. The inactive library section resides in the ORSER facilities at 220 Electrical Engineering West Building. The inactive section is managed by ORSER personnel.

Tape Labels

To meet with the Computation Center requirements, every tape in the active library has been assigned an external label, which appears on the tape cartridge and reel. This is the "ORSER external label." This label must be used in computer processing in accordance with the Computation Center and ORSER program procedures. For convenience in use, each internally labeled tape has identical internal and external ORSER labels. A tape in the inactive library will have been assigned an ORSER external label if, at any time, the tape was in the active library.

The ORSER library is dominated by tapes containing satellite multispectral scanner data from the NASA-ERTS program. Tapes delivered to ORSER from the NASA-ERTS processing facility are referred to as NASA-ERTS tapes. Each NASA-ERTS tape is first entered into the inactive library. Depending on the quality of the data, the tape may remain in the inactive library or be transferred to the active library. For a NASA-ERTS tape entered into the active library, a comprehensive subset tape will be made as soon as possible, after which the NASA-ERTS tape may be returned to the inactive library. The comprehensive subset tape will remain in the active library.

NASA-ERTS tapes that have never been in the active library are catalogued according to the NASA external label. For these tapes, the NASA external label appears on the edge of the tape container as well as on the reel.

All NASA-ERTS tapes have the NASA external label affixed to the tape reel. The NASA external label for satellite data is described in Figure 1. All of the NASA-ERTS tapes and images for satellite data are in bulk processed form. No precision processed satellite data have been ordered. However, the tape management procedures for these would be the same as for bulk processed tapes. The annotation on the bulk and precision processed imagery is organized differently. In Figure 1, the cross-reference of NASA-ERTS tapes to the corresponding imagery is based on bulk processed data and imagery. The scene date, field number 6 in Figure 1, corresponds to the scene date field on the lower left corner of the imagery. The scene identification numbers in fields 1, 2, and 3 of Figure 1 correspond to the scene identification given on the lower right corner of the imagery. The NASA external label scene identification cannot be used as the ORSER external label because the number of digits is too large to meet the Computation Center's external label requirements. The catalogue of NASA-ERTS tapes incorporates the

CCT					5 CCT Date _____	
					6 Scene Date _____	
1	2	3				
S/C	DAY	HH	MM	S	B (SENSOR)	P (PROC.)
					4	7
1 of 4 2 of 4 3 of 4 4 of 4				7TR 9TR		
8				9		
REMARKS				OPERATOR: _____		

- 1 Satellite number. ERTS-1 = 1.
- 2 The day (since launch) on which the observation was made.
- 3 Hour of day (HH), minute (MM), and tens of seconds (S).
- 4 Sensor code: R = RBV, M = MSS.
- 5 "CCT Date" = Date the computer compatible tape (CCT) was generated.
- 6 "Scene Date" = Date of observation.
- 7 Processing code: P = Precision, B = Bulk.
- 8 Appropriate reel number will be circled by the operator.
- 9 Number of tracks will always be 9 for ORSER use.

Figure 1. Details of the NASA external label.

cross-reference feature described above. Detailed descriptions of these catalogues are presented later.

File Protection of Tapes

File protection information for each tape is given in the catalogues. Three types of file protection exist for remote sensing data tapes: unprotected, partially protected, and positively protected. File protection governed by the presence or absence of a file protection ring is not reliable because of the conventions and procedures of the Computation Center. File protection is governed by the presence or absence of internal system labels on tapes and the retention date for internally labeled tapes. Tapes that have essentially no protection have internal system labels without any retention date. Each one of these is protected only insofar as it can be accessed by reference to the correct internal label. Working tapes must be of this type in order to be able to accept output. Data that are valuable, in that they would be very difficult or expensive to restore, should not be kept on an unprotected tape.

Positive protection (date protection) can be gained by copying or outputting the data on a tape for which a JCL

retention date has been specified. ORSER users should not use the date protection feature. For tapes that should be date protected, ORSER personnel will do it upon request.

An intermediate level of protection exists, called here "partial protection," and occurs only for tapes provided to ORSER from extra-University sources, such as the NASA-ERTS tapes. Partial protection exists for internally labeled tapes in that access to such tapes can be gained only by using Job Control Language (JCL) to specify an unlabeled (not internally labeled) tape. This occurs rarely in routine processing through the Computation Center. In addition, the external label would have to be given (by mistake) or the wrong tape mounted for the tape even to be made physically available to the computer.

Classification of Remote Sensing Data tapes

Remote sensing data tapes are classified into five categories as follows:

1. NASA-ERTS data tapes,
2. permanent subset data tapes from
NASA-ERTS tapes,
3. ORSER users data tapes,

4. other data tapes used by ORSER, and
5. private data tapes.

Catalogues exist and are maintained for each of the first four categories. Tapes in these categories contain data that are available for use by ORSER personnel. Remote sensing data tapes in category five are not considered to be available for use by ORSER personnel and, as such, are not entered into the ORSER tape library. Management of tapes in category five is the responsibility of the individuals to whom the tapes belong.

NASA-ERTS Data Tapes

NASA-ERTS data tapes in the active library are identified by an ORSER external label of the form NAXXXX, where NA identifies the tape as a NASA-ERTS tape and XXXX is the field that identifies the specific tape. These tapes are 9-track, unlabeled, 800 b.p.i. tapes and are partially file protected. They may not be used for output.

NASA-ERTS tapes in the active library contain substantial amounts of potentially useful data. Such tapes may be transferred to the inactive library after comprehensive subset tapes have been made from them. NASA-ERTS tapes that have no useful data (for example, because of 100 percent cloud cover) are not entered into the active

library as a general practice and subsets from them are not routinely made.

NASA-ERTS tapes are in the format specified by NASA in "Format and Content Specification for Computer Compatible Tapes," May 1, 1972, published by the Goddard Space Flight Center, Greenbelt, Maryland. They can only be read by the SUBSET program.

Permanent Subset Data Tapes from NASA-ERTS Tapes

It is expected that a permanent subset tape will be made for every NASA-ERTS tape that contains potentially useful data. The NASA-ERTS tapes are not intended to be used as the active data bases for routine use, but rather as archives of data from which active data bases are prepared by subsetting. Therefore, before a user decides to use a NASA-ERTS tape, he should make certain that no suitable subset data tape is in the library. If none exists, then it will be necessary to generate such a subset tape from the NASA-ERTS tape; but, in doing so, the user should define the subset to be broad enough so that another subset from the NASA-ERTS tape does not have to be made.

Permanent subset data tapes from NASA-ERTS tapes will, in general, always be in the active library and are identified by an external label of the form SUXXXX. SU

identifies this category and the XXXX field identifies the specific tape. These are 9-track, labeled, 1600 b.p.i. tapes and are date protected so they cannot be used for any other purpose than to contain these subsets. They are in the ORSER format and may be used directly with any programs in the system, including SUBSET. The contents of any of these tapes can be found by referring to the catalogue.

These subset tapes are intended to be used instead of the NASA tape. The advantages of a permanent subset tape over the corresponding NASA-ERTS tape are: (1) the subset tape is in the ORSER format and can be used directly by any program in the system ; (2) the 1600 b.p.i. density doubles the tape processing speed; and (3) where only scattered blocks of data are potentially useful on the NASA-ERTS tape, these have been consolidated on the subset tape thereby eliminating tape processing time devoted to bypassing useless data. If a permanent subset tape has been made, the corresponding NASA-ERTS tape is not likely to be in the active library.

ORSER Users Data Tapes

ORSER users data tapes are identified by RSXXXX, where RS identifies this category and the XXXX field identifies the specific tape. These tapes are catalogued according to the data sets on them if such data sets are essentially permanent and of general utility to ORSER users. Others of these tapes are assigned to ORSER users as work tapes for the purpose of constructing and holding data subsets for their particular uses. Data sets on any of these tapes are considered to be available for use by anyone in ORSER. They may not be reserved for strictly private data sets.

Other tapes in this category may come about as the result of subsetting aerial flight tapes, such as LARS data tapes. In such cases, the subsetting is done to acquire a working copy of an original, to put the data in the ORSER format, to gain data protection, and to take advantage of 1600 b.p.i. density.

After a user has developed a subset of data on one of his assigned tapes, which would be of general interest to other users and which would not be subject to major changes, he should have the tape catalogued according to its contents. ORSER users tapes may or may not be file protected at the discretion of the user in consultation with ORSER personnel.

Other Data Tapes Used by ORSER

Other remote sensing data tapes that are available for use by ORSER personnel are in either the active or inactive library and each may contain remote sensing data from one of a variety of sources. Examples of such tapes are the Bendix flight tapes and LARS data tapes. These are catalogued according to their contents, but there is no particular uniformity in the external labels, except that they are not labeled as belonging to any of the above categories. The tapes may or may not be in the ORSER format; but, in general, they can be read by the SUBSET program using the appropriate control cards. Data on these tapes are available to all ORSER users, but frequently permanent subset tapes have been made from them and these should be preferred for use, for reasons stated earlier. When permanent subsets exist, they are indicated in the catalogue. The catalogue for these tapes indicates whether imagery or aerial photography exist corresponding to data on the tape and, if so, where these can be located.

Private Data Tapes

Users' other private data tapes are the users' own concern, but, to avoid confusion, they should not be labeled as belonging to any of the above categories. They are not

catalogued unless the user requests it, under which conditions the data must adhere to one of the acceptable formats and must be available to any other ORSER users.

The NASA-ERTS Tape Catalogue

The NASA-ERTS tapes are catalogued roughly in the order of the overpass of the satellite. The first field in the catalogue line for a tape (see Figure 2) specifies the ORSER external label of the tape. The label appears on the cartridge and on the reel. If an ORSER label has not been assigned, the field will be blank and the NASA external label will apply. The NASA identification field gives the NASA external label in the form and content expressed in Figure 1. This identification corresponds to the image identification. Four reels of tape are required for each scene. Each reel corresponds to a 25 n. mi. wide by 100 n. mi. long strip in a north to south orientation. The reels are numbered from west to east. The date of the overpass is then given. The status field indicates whether the tape is in the active or inactive library. The active library is at the Computation Center. Any tape in the active library can be accessed directly by the user's

ORSER Label	NASA ID	Reel	Imagery Date	Status ¹	Alternate Tape Reference	Imagery Available	File Protected ²	Date Catalogued	Date Received
NA0012	1045-15240	1	9-6-72	A	SU0001	7	P	12-17-72	11-29-72
NA0013	" "	2	"	A		7	P	"	"
NA0014	" "	3	"	A		7	P	"	"
NA0011	" "	4	"	A		7	P	"	"

¹A - in active library; I - in inactive library.

²File protection: N or blank - not protected; P - partially file protected; Y or date - protected indefinitely or until the specified date.

Figure 2: Sample page from the NASA-ERTS Tape Catalogue.

programs by specification of the tape label in his control information. The inactive library resides at 220 Electrical Engineering West Building. Tapes in the inactive library cannot be accessed directly by programs, but must first be entered in the active library. ORSER will do this for users on request.

The alternate tape reference field indicates whether a subset has been made of all the potentially useful data from the NASA-ERTS tape. If such a subset has been made, the tape label for that subset tape will be specified in the field, otherwise, the field will be blank. Permanent subset tapes will generally be made and are recommended as alternatives to the NASA-ERTS tapes that contain any data worthy of investigation. Subsets will not exist for NASA tapes for which cloud cover is essentially total.

The imagery-available field specifies the channels of imagery for the scene that have been received by ORSER. If imagery has been received, an Ozalid copy of the imagery from one channel will be inserted behind the data sheet for the scene for cross-reference purposes. The quality of the image is not important in this use. The images are marked to show the four 25 n. mi. by 100 n. mi. strips. When permanent subsets have been made, the areas in each subset are marked and the external label of the subset tape is given.

NASA-ERTS tapes are only partially file protected as indicated by the next field. The two date fields are self-explanatory.

The Permanent Subset Tape Catalogue

The catalogue of permanent subset tapes from NASA-ERTS tapes is organized, in general, in the same way as for the NASA-ERTS tapes. Only the differences will be discussed here. The tape label (see Figure 3) always has SU as the first two characters. The subset source field is for reference to the NASA-ERTS tape or the subset tape from which the subset was made. The retention date field specifies the date to which the tape remains positively file protected. If the field is blank, the tape is unprotected. The rest of the information follows the same specifications as apply to NASA-ERTS tapes. The imagery in the "NASA-ERTS Tape Catalogue" shows the general areas included in the subset for each of these subset tapes.

ORSER Label	NASA ID	Reel	Imagery Date	Status ¹	Subset Source ²	Date Generated	Retention Date ³
SU0005	1080-15192	1	10-11-72	A	NA0031	3-10-73	
SU0006	" "	2	"	A	NA0032	"	
SU0007	" "	3	"	A	NA0033	"	
SU0008	" "	4	"	A	NA0034	"	

¹A - in active library; I - in inactive library.

²Refers to the actual tape used in generation of the subset.

³Tape is positively file protected until the given date, otherwise it is not file protected.

Figure 3: Sample page from the Permanent Subset Tape Catalogue.

The ORSER Users' Data Tape Catalogue

The first field in the "ORSER Users' Data Tape Catalogue" specifies the ORSER label for the tape (see Figure 4). All tapes in this catalogue have RS as the first two letters of the ORSER label. The next field states the name of the user to whom the tape was assigned. If the name "ORSER" is given, the tape is a permanent subset tape of general interest to ORSER users. Tapes that were initially assigned to a specific user and contain subsets of general interest are reassigned to ORSER at the user's request or when the user becomes inactive in ORSER.

The subset source field designates the identification of the tape from which the present tape was generated. An ORSER label is given if such exists and, if not, another appropriate label is given as used in one of the catalogues. The collection date field refers to the day, month, and year the data were collected. The status field indicates whether the tape is in the active or inactive library. The NASA-ID field specifies the NASA internal label if the subset source is a NASA-ERTS tape. The remaining two fields are the same as described for the "Permanent Subset Tape Catalogue."

ORSER Label	User Name	Subset Source ¹	Collection Date	Status ²	NASA ID (if applicable)	Date Generated	Retention Date ³
RS0001	ORSER	LAKS 4	5-69	A		1-9-73	
RS0002	D. WILSON	NA0015	8-19-72	A	1027-15240	12-1-73	
RS0003	ORSER	SU0001	10-11-72	A	1080-15185	1-10-73	

¹Refers to the actual tape used in generation of the subset.

²A - in active library; I - in inactive library.

³Tape is positively file protected until the given date, otherwise it is not file protected.

Figure 4: Sample page from the ORSER User's Data Tape Catalogue.

The Other Remote Sensing Data Tape Catalogue

The "Other Remote Sensing Data Tape Catalogue" is organized to have one tape description per page. The upper part of each page follows the field descriptions of the previous section. The lower part of each page contains a more comprehensive description, according to the headings, than is possible by filling in blanks and is self-explanatory (see Figure 5). For users who submit data tapes to the library in this category, it is extremely important that these sections be filled in with as much detail as possible. Whenever other documents or publications can be referred to for more detail, they should be indicated, but not substituted for the description requested on the form.

Tape Detail Catalogue

Detailed information sheets, obtained by use of the TPINFO program, for data tapes of general interest form the "Tape Detail Catalogue." For subset tapes, the item of major importance in this catalogue is the table of contents giving the line and element specifications for each block subset onto the tape. Information for original tapes is included

Orser label HU0001
 Other identification MISSION #207, AREA(S) T, V
 Reel number 1
 Collection Date JULY 20-21, 1972
 Status¹ A
 Alternate tape reference _____
 Date catalogued 3-15-73
 File protection² P
 Imagery reference:
 T- ROLL 89, FRAMES 1-3
 V- ROLL 89, FRAMES 7-9
 Geographical area description:
 FLIGHT #2, HARRISBURG TO PHILLIPSBURG
 Purposes for which is intended or has been used:
 GROUND-TRUTH DATA FOR ERTS MSS DATA
 Description of data collection system, flight, etc.
 C130 AIRCRAFT, BENDIX 24-CHANNEL SCANNER (4, 8, 9, 10, 14, 21)
 ERROR PRINTOUTS AVAILABLE (REF. SECTION 2.2-107 IN *)
 Format description:
 UNIVERSAL FORMAT, DISCOURAGED ARRANGEMENT, REFER TO
 *EARTH RESOURCES DATA FORMAT CONTROL BOOK, SEPT., 1972.
 SECTION 4.2.

¹A - in active library; I - in inactive library.

²N or blank - not protected; P - partially file protected;
 Y or date - protected indefinitely or to the specified date.

Figure 5: Sample page from the Other Remote Sensing Data Tape Catalogue.

only if a corresponding complete permanent subset tape has not been made. Working tape information is included only for such tapes that are of general utility for ORSER users. The TPINFO program may be used at any time to obtain information on any tape in the event the TPINFO output for that tape is not found in the "Tape Detail Catalogue."

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